

How Many People Does it Take to Ruin an Ecosystem?



Objective

To learn how animals and plants depend on each other in ecosystems and how human activities can impact ecosystems.



Activity Description

Students will role-play elements of a food web to illustrate the connections in ecosystems and will respond to real-life scenarios that impact ecosystems.



Materials Needed

- Red stickers
- Green stickers
- Black stickers
- Cardboard
- String



Subjects Covered

Food chain
Food web
Ecosystem



Duration

1 to 2 hours



Skills Used

Communications
Motor skills



science



social studies



Activity

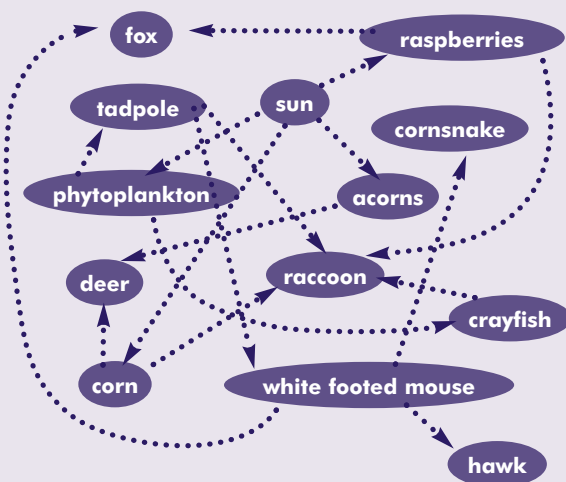
Step 1: Discuss ecosystems with students and identify the types of ecosystems that exist in your geographical area. Select an ecosystem to study (e.g., forest, meadow, stream, pond).

Step 2: As an in-class exercise with students, brainstorm some of the animals and plants that make up that ecosystem. Have a student write everything on the board and have the class create links between the items that plants and animals eat and those that eat them. The result should be a complex food web (see example in the side bar). Leave the food web on the board until the next day.

Step 3: Assign each student to a particular plant or animal that exists in a

Sample Food Web:

(in an Eastern U.S. deciduous wooded ecosystem)



Arrows indicate the direction that energy is transferred.

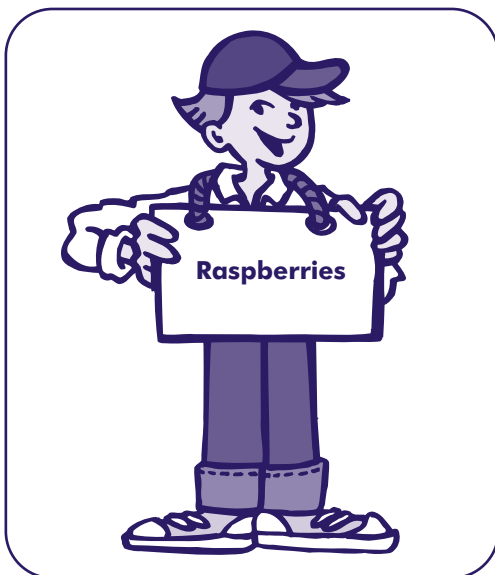


Journal Activity

Ask students to describe a natural place that is special to them. Have them write about what lives there and why it is so magical. Or ask them to write a poem that is in the shape of something in nature.

specified ecosystem. Have them research (either at the school library or on the Internet) what the plant eats, what eats it, and any factors that are necessary in its habitat for survival. Have students tell the class what they found, in 5 minutes or less, modifying the existing food web as you go.

Step 4: Have students create a placard to identify themselves as a certain plant or animal. All students should start off with a green sticker on their placard, indicating that the population of their plant or animal species is healthy.



Step 5: Facilitate an exercise in which each person holds hands with the person wearing a

sign of the animal or plant that they eat. The result should be a tangled web of students, holding several people's hands.

Step 6: Now, introduce some human-created scenarios that would affect this ecosystem (see examples below). When an animal or plant is affected, a red or black sticker must be placed on the person's placard. For example, in a meadow ecosystem, a scenario might be that a farmer applies pesticides to the meadow, which kills off the Monarch Butterflies. Whomever is playing the role of the Monarch Butterfly would put a black sticker over top of the green sticker (and should be removed from the web). Students should be asked to identify what other species are affected by the disappearance of the Monarchs in this ecosystem. Those that are affected (that depend on the Monarch for food or that serve as prey for the Monarch) should place a red sticker over top of the green sticker, indicating the species is in trouble.

Sample Scenarios of Human Activities That Could Affect Ecosystems:

- Pesticide-containing runoff makes its way into a stream from which animals drink.
- A household dumps used oil in the storm drain, which empties out into a bay.
- An old-growth forest is clear-cut.
- Hazardous waste from a factory is dumped into the river.
- Acid rain from factories kills off trees in a forest 200 miles away.

Step 7: Introduce several detrimental scenarios until the students decide that the ecosystem is no longer viable and should be considered destroyed.



Assessment

1. Have students define and describe a food web.
2. Ask students to describe the characteristics of an ecosystem.
3. Ask students to explain how several elements of an ecosystem can be harmed even if only one element is initially affected.



Enrichment

1. Repeat the exercise described in Step 6, but this time use examples of recent human actions and efforts to make a positive impact on an ecosystem. For example, through the work of biologists and naturalists, the fox is reintroduced into an ecosystem and environmental groups help Congress to pass and enforce laws to protect its habitat.
2. Present the class with a scenario that pits human activities against an ecosystem. Break the class into groups and assign different roles to the different groups. For example, one group could represent a developer that wants to fill in a wetland to build a shopping mall. Another group could represent a group of citizens of that community that want to save the wetland. Another group could represent the new workers who could benefit from jobs at the new mall. Students should be instructed to think of all the reasons why they would support or oppose the mall from their perspective and have a mini-debate about the issue.
3. Take the students on a field trip to a local park, stream, pond, or wooded area, and take an inventory of all the common birds and plants that are observed in that ecosystem. Students could learn how to use field guides and identify the species observed.
4. Give the students a list of species that have become extinct in the last 100 years and ask them to research how they became extinct (e.g., overharvesting, habitat destruction) and present the information to the class, along with a description of the species and/or a photograph. This will help the class appreciate the beauty of many of the extinct species and gain an understanding of the human activities that caused their demise.